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delicate, horny pen, which forms a sort of stiffener to the back. In some species the pen is hard, thick and broad, and the cuttle-fish bone of commerce is a pen of this kind. The species found in our waters is very small, and not at all dangerous, being barely large enough to draw blood from the hand; but in the tropical seas they are very large, powerful and dangerous.

The cuttle-fish is the original of Victor Hugo's devil-fish, so vividly described in the "Toilers of the Sea." If the devil-fish were a beneficent creation, I should be sorry to destroy your faith in it; but as it is, I believe it will be rather a relief than otherwise to know that in some important respects, Victor Hugo's story of it is a fable. The Kraken was a mythical cuttle-fish of fabulous size.

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## SOMETHING ABOUT CRABS.

BY REV. SAMUEL LOCKWOOD.

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WELL do we remember our boyish sport catching crabs. A stout string, a piece of fresh offal, a hand-net, and another boy with us and a good place on an anchored raft,—then for fun. The meat was dropped to the bottom; the cancerous varmint took hold, and kept hold; then we slowly drew the bait up, and, when within a few inches of the surface, chum adroitly slipped the scoop-net under. But would'nt "spider-legs" run up the sides of the net! It needed all our alertness to secure the prey. What a luxury those crab dinners! But what was that pleasure compared to the delight of our riper years, when we made the acquaintance of the inner life of these entertaining people, Lupa, Libinia, Pagurus, and others. We have spent many health-giving days with them at the "watering-places," and many hours in the drawing-

room, they affording us abundant refined entertainment in return for our aquarian hospitality.

A wonderful thing, so considered, is told in the court journals of the Empress Eugenie on public days; how that she appears in sumptuous array, and then will disappear, and in an incredibly short space of time reappear in an entire and elaborate change of dress. Her admirers gaze as if it were magical. But suspended from the ceiling of the boudoir, garment within garment is the awaiting suit. The Empress has but to doff, and then to don, while many zealous and tasteful fingers are busy all around—a little readjustment of her coiffure, and presto! all is done! and the changed creature is again among her astonished admirers. But suppose an old knight could put off as one unbroken suit his iron encasement, with not so much as the unlacing of his gear, and then on the nonce should appear in a new suit of mail of high finish and faultless fit,—would not this man in iron beat my dame in silk? And yet the knightly and the queenly feat are nowhere when we instance the exuviation and redressing of Mrs. *Lupa dicantha*, the common edible crab. During the first year of its life, this crab puts off its hard shelly encasing several times. That is to say, when a youngster, it requires several new suits. After the first year until it gains the fully matured age, an annual suit suffices. When fully grown, its case is permanent. We knew some years ago an old crabber, wholly illiterate, but whose intelligence was above the average. He had “crabbed” for the market many years. Often when supplying our family with fish, has he been closely questioned by us about the crabs, and always have his statements tallied one with another. In our notes occur the following in the fisherman’s own words:—“I hev ketched soft crabs for market many a year. The crab sheds every year, chiefly in early summer. At that time the he one is mighty kind to his mate. When she shows signs of shedding, the he one comes along and gits on the she one’s back, quite tenderly-like, and entirely

protects her from all enemies, whether of fishes, or of their own kind. She is now getting ready to shed, and is called a *shedder*. Soon the back begins to burst nigh to the tail. She is then called a *buster*. The he one is then very anxious to find a good place for her, either by digging a hole in the sand or mud, or else looking up a good cover under some sea-weed. Here he brings her, all the time hovering nigh, and doing battle for her if anything comes along. She now—and it only takes a few minutes—withdraws from the old shell. And she comes out perfect, every part, even to the inside of the hairs, eyes and long feelers, almost like the whiskers of a cat. At the first tide she is *fat*, and the shell is soft, just like a thin skin. She is then called a *soft shell*, and it's the first-tiders that bring the high price. At the second tide she is perfectly watery and transparent, and is called a *buckler*; but she is not worth much then. At the third tide she is again a *hard shell*, just as she always was, only bigger."

"Have you seen all this with your own eyes?" we asked.

"Lor, sir, yes, hundreds and hundreds of times."

For the sake of contrast with these observations of an illiterate man, let us give the gist of an entertaining passage from Gosse :

"Peering into a hole I saw a fine large crab. Though he made vigorous efforts to hold fast to the angles of his cave, I pulled him out, and carried him home. I noticed that there came out with him the claw of a crab of a similar size, but quite soft, which I supposed might have been carried in there by my gentleman to eat, or accidentally washed in. After I had got him out—it was a male—I looked in and saw another at the bottom of the hole. Arrived at home I discovered that I had left my pocket-knife at the mouth of the crab-hole. I returned, the crab had not moved. I drew it out, as I had done the others. But lo ! it was a soft crab, the shell being of the consistence of wet parchment. It was a female, too, without any sign of spawn, and had lost one

claw. I carefully put the helpless creature into the hole again.

"What then are we to infer from this association? Do the common crabs live in pairs? And does one keep guard at the mouth of the cavern while its consort is undergoing its change of skin? If this is the case it is a pretty trait of cancrine sagacity, and one not unworthy of their acute instinct and sagacity in other respects. I have no doubt that the claw of its mate was unintentionally torn off in its efforts to grasp some hold when resisting my tugs in dragging him out."

See, then, the beautiful parallel—the simple remark of the illiterate observer, and the learned queries of the practised naturalist.

Not a little interest have we felt in an individual known to us as the "Sea Spider," or "Spider Crab." Wishing to make a good introduction for our friend, and as some who have no desire to know Mrs. John Smith might perhaps feel flattered if presented to the lady of Johannes Smythius, Esq., so we would say, that by Spider Crab, we mean no less a personage than *Libinia canaliculata*. She is regarded by some as a pest on the oyster beds, and is accused of eating the oyster spat or young. How much truth there may be in this is to us unknown. At any rate we have never seen the slightest evidence to sustain the charge. We have regarded her appetencies as omnivorous. But, as our acquaintance has been chiefly in the drawing-room, it may be that there her tastes became fastidious. One peculiarity of habit is all that we have time to describe. The Spider Crab will grow as large as one's hand. A pet that we had a long time was only an inch wide across the shell. We must tell the truth, and say that her aspect was not the most tidy or even cleanly. Her back looked much as if she had taken a glue bath, and then, like a chicken, a dust bath afterwards. Through this agglutinous coat sundry small sharp spines appear. She does not covet society, and so withdraws to

a cozy grotto, whose walls are green with the tender little fronds of the young sea-lettuce, the *Ulva latissima*, and the delicately crimped ribbon leaves of the *Enteromorpha intestinalis*. It did not please us much to see the pert Libinia, with her nippers like little shears, snipping off the velvet lining of the cave. Being indulgent we did not interfere, but left her to her own enjoyment. When we returned, out came Mrs. Libinia in full dress to greet us. On every spine of her uncouth carapace was a green ribbon,—all gracefully waving as she strutted in the open grounds of the establishment. What a sight to look at! And what a lesson in animal psychology! What was the mental process? Was it a device,—“a moving grove,” like Macduff’s, in order to deceive its prey? If so, what intelligence! Or, was it her vanity? Done just for the looks of the thing! If so, what inexplicable caprice! This fact we have seen; and an intelligent aquarist friend assures us he has seen it a number of times. The English naturalists tell the same of their Sea Spider (*Maia squinado*). And one of them (Harper) even, makes us almost believe that when this humor is upon it, it will even dance, or at least exercise a certain rhythmic movement at the sound of music. Query; has it that hardihood when it hears the refrain:

“They hang both men and women there  
For the wearing o’ the green!”

If so, Madame Maia, may your gayety never be your ruin.

We can only introduce one more of these curious little creatures, and that must be the little Hermit Crab, the *Pagurus longicarpus*, so common on our shores. Though a recluse, for he lives in a vacated sea-shell all alone, yet of hermit gravity he has none. In fact he is constitutionally a funny fellow. This crab has his two hands, or claws, greatly larger than the others; and of these, the right one is much stouter than the left. The next three pairs of claws behind are tipped with simple hooks, which having a considerable leverage power, are really efficient grapnels with

which to pull himself along when he travels, carrying his house on his back; while the claws of the fifth or last pair are very diminutive, and yet have a beautiful structural relation, as they enable the animal to perform the small amount of movement needed by the body inside the shell. Behind all these limbs the body is entirely naked, hence the necessity of an empty sea-shell with which to cover it. On the extreme end of the naked body is an apparatus for taking firm hold of the little column in the upper part of the shell.

There is a queer monkey-like drollery in the looks of the Little Hermit. We had in our aquarium one of rather large size, and which occupied a shell of the required capacity. Of this specimen we were very proud. The shell on its upper part was ashen white, with a fine colony of Hydractinia, like tiny sea-daisies. And mystic beings they were; for by that strange law of parthenogenesis, they were the great-grandparents of those huge and splendid creatures, the gorgeous Acalephs! We had also a little Hermit in a small *Nassa obsoleta*. And what about this young scapegrace, whom we soon almost wished obsolete? On he came, and climbed right up into this pretty parterre, and having secured himself with his grapnels on top of his neighbor's house, most deliberately, now with the right claw, and now with the left, he pulled off my weesome pets, stowing them into his ugly mug with a movement so regular, that it seemed almost rythmical, and yet so cruelly comical, that it made me most laughably mad.

But the Hermit grows, while the sea-shell which he occupies does not. Hence like many bipeds, he has his "first of May." So he goes house-hunting. This must be understood literally. He finds a shell. Will it do? First then is it really "to let." He will "inquire within." This he does, if not the most courteously, very feelingly. Satisfied on this point, the next question is, will the house suit. He turns it over, then turns it around. You see the weight of

one's house is quite an item in the reckoning to him who has to carry it on his back. One inspection more. How is it inside? Is it entirely empty, and is it of the right size? Up goes one of the long slender limbs of the second pair, and the interior is thoroughly explored. All right! Just the house he is after. His mind is now made up to move. Look at him! Quick! or you'll miss it! Out comes the body from the old house, and pop it goes into the new one! The resolution to move was taken, the surrender of the old house was made, and the occupancy of the new was effected, and all within a fraction of a second of time.

Sometimes this matter goes on less pleasantly. Two house-hunters may find the same tenement. Should both desire it then comes the tug of war. Live together they neither can, nor will. The affair is settled by a battle, in which the stronger usually proves his claim right by the Carlyleian logic and morals, viz., might. Quite often from these encounters a terrible mutilation results.

To us it is a sad sight to see the Little Hermit, when "his time has come," and he knows it; that is when Pagurus must die. However droll his career may have been, the Little Hermit is grave then. And what a strange fact it is! Who can explain it? The poor little fellow comes out of his house to die! Yes, in order to die. To us humans home is the only right place to die in. But for Pagurus home has no attraction at this solemn time. Is it because he feels encoffined that he comes out, that "his feet may be in a wide place?" Poor fellow, with a sad look and melancholy movement, he of his own will quits the house for which he fought so well. Those antennæ, or feelers, that often stood out so provokingly, and were so often poked into everybody's business, now in a feeling manner lie prone and harmless. The eyes have lost their pertness. There lies the houseless Hermit on that mossy rock, stone dead!

The human side of these lowly creatures, as unfolded by close observation of their habits, is much better understood



in England than with us. Our naturalists seem to be chiefly occupied with the study of structure. When their habits are better understood we shall doubtless learn something which as yet are only known of foreign species. One of these we would instance in closing.

The Hermit, as its name imparts, loves solitude so far as the occupancy of its shell is concerned. There is an English species, Prideaux' Hermit, that seems to take Patrick's view of seclusion: "Its very nice to be all alone by one's self, especially if one has his sweetheart with him." So this Hermit believes in having for a companion the dressy Cloaklet Actinia; nor will he live without her. And if form and color be considered, remarkably recherche is this Sea-anemone. Her form adapts her to surround the shell mouth like a frill, while her disk is of waxy white, and the rest is elegantly varied with reddish-brown, rose-purple and scarlet. This gorgeous creature adheres around the entrance of the Hermit's shell, so that his lookout is from a mantel richer than any field of cloth-of-gold. But when the Hermit has outgrown his house, and moving-day comes, does he leave his beautiful though helpless companion? No, a better galantry is his. He causes her to loose her long adherence to the shell's mouth, and to cleave to the underside of his thorax. In this way he carries her with him to their new home. And what then? Most tenderly he places her in position, and holds her there until a good adhesion of the base takes effect, when she with her protector, is snugly domiciled again. These facts are given in pleasant detail by Gosse, from whom we quote the following:

"Is there not here much more than what our modern physiologists are prone to call automatic movements, the results of reflex sensorial action? The more I study the lower animals, the more firmly am I persuaded of the existence in them of psychical faculties, such as consciousness, intelligence, will and choice! and *that*, even in those forms in which as yet no nervous centers have been detected."

Thus ends our history of these cancrine crustacea, as the naturalists call them, namely, the crabs. Our hope has been that the reader does not regard it as crusty, cancer-ous, or crabbed.

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## SHELL DREDGING.

BY EDWARD S. MORSE.

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A STRONG arm and an immunity from sea-sickness are among the important requisites of a good dredger. To one who has pulled up a well-filled dredge from fifteen or twenty fathoms, the necessity of a strong arm is obvious, especially if this act has been attended with the not unusual accompaniments of a rough sea, and a cold breeze which stiffens the fingers while grasping the wet rope. One can only pity those who are sea-sick, for they are helpless.

In dredging one oftentimes enjoys the keenest pleasure, attended with the greatest bodily discomforts. The miseries we will not mention. The delights come when the contents of the dredge are sifted, and there lies before you the only treasures of the deep; treasures that can be obtained in no other way. It is true that many deep-water species of shells are obtained from the stomachs of the haddock, cod and other fishes, particularly from the haddock, which seems to live principally on mollusks. Specimens procured from this source are generally impaired by the action of the juices of the stomach. The beauty of dredging consists in getting the objects in their living condition; and then you may keep them alive in sea-water for some time, and see them crawl about and watch their singular ways.

A dredge should not be too large, perhaps sixteen inches across the mouth. The frame is made of a flat bar of iron, an inch in width and an eighth of an inch in thickness, one edge of which should be hammered sharp and turned out, to